

# **Puget Sound's Maritime Industries—The Health of Puget Sound: An Alternative View**

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## **Introduction**

Most of the presentations you will have heard at this conference will have dealt with the physical health of Puget Sound: water quality, habitat integrity, aquatic species diversity and abundance, and so forth. In this paper I address another dimension of Puget Sound's health: The capacity of its shorelines to sustain the cultural, social and economic well being of the region's peoples.

The cultural/historical health of the shorelines can, in part, be sustained by celebrating the Sound's historic role in shaping cultures and history, restoring and preserving historic shoreline structures, and protecting and interpreting culturally important sites. We can ensure that historically significant buildings and sites of important events are not lost through neglect; and we can mark and interpret them through exhibits and interpretive programs. In this fashion we can celebrate the many ways the Sound has shaped us and those who were here before us.

The social health of this maritime region is enhanced by protecting and enhancing public access to and from the Sound, maintaining per capita share of shoreline parks and open space, and enabling safe and diverse recreational uses of the water surface and water column. As our region's population grows we can expand the opportunities for the public to reach the Sound and to recreate beside, in, and on the water; and to do this in ways that allow diverse uses and users to enjoy the experience safely.

Sustaining the health of our maritime economy is achieved by giving priority to water-dependent industry in shoreline siting decisions, reserving sites for deep draft vessels, ensuring compatible upland uses, and maintaining adequate landside transportation infrastructure.

Our limited shores provide the only sites where certain industries can manufacture the products we need and provide the services we demand, and where ports can move the goods we consume. We need to give these uses priority over those that can prosper across the street from the water's edge, or on sites far inland. We also need to avoid unwittingly creating conflicts by permitting inappropriate upland uses to interfere with the functioning of those uses that depend on a shoreline location. The federal Coastal Zone Management Act and the state's Shoreline Management Act (SMA) both embrace these fundamental coastal planning principles (Wagner, 1985). The research project reported in this paper addressed this last dimension of an alternative "Health of the Sound" viewpoint.

## **Objectives**

### **Research Questions**

In a Sea Grant-supported project that began in 1983 and was updated in 1995–96, we asked four questions concerning the sustainable economic health of the Sound:

- What kinds of commercial/industrial establishments occupy shoreline parcels?
- Which industries are water-dependent?
- How has the mix of shoreline industries changed over time?
- Has shoreline management been effective in protecting water-dependent (W-D) industries?

Answers to the first two questions have been published elsewhere (Goodwin, 1987).

The industry inventory of Puget Sound's urban harbors was updated in 1995–6 to include 1992 data, and the region-wide changes occurring over the 1962–92 period were reported in a paper presented last year (Goodwin, 1997). Answering the final question involves analyses of both shoreline industry data and case studies of shoreline management decisions.

The loss of W-D firms from the shorelines of Puget Sound can be caused by many factors:

- business failures due to competition from domestic or foreign firms in the same industry
- retirement of principals
- displacement by non-W-D businesses competing for the same site

Shoreline management, through control of land and water uses and development regulations, can only address the last of these—displacement. Consequently, it is important to examine case examples of shoreline management decisions to understand the role it has played. The real story concerning displacement is found in the details of such individual cases, not in the gross numbers of businesses moving from (or within) the shorelines of Puget Sound.

While this is not, strictly, a land use study, nor an economic analysis in the sense of measuring changes in dollar output or jobs, it *does* reveal the consequences of land use decisions through an examination of the changing industrial structure of our urban shorelines.

## **Methods**

A comprehensive study of Puget Sound's urban harbors was conducted during 1983 and 1984. Harbor-by-harbor inventories of commercial and industrial establishments occupying waterfront parcels were created for the years 1962, 1972, and 1982. These intervals were chosen to coincide with Bureau of Census' economic reports and to reveal changes during the decades before and after passage of Washington's Shoreline Management Act in 1971.

Washington State's Department of Revenue (DOR) provided the researchers with a tape containing records of all firms located in urban coastal zip code areas around Puget Sound in 1982. Firms paying either Business and Occupation (B & O) tax or state sales tax appeared in this file. An attempt was made to partition the records into shoreline and upland addresses; but a high proportion of firms reported either from post office boxes, or from corporate headquarters located outside the shoreline.

The researchers turned to city directories, where available, to construct inventories of shoreline businesses for the years 1962, 1972, and 1982. For each firm extant in 1982, an attempt was then made to match it with DOR records (available only in electronic form from 1975 onwards). Site visits were made to verify the location of shoreline addresses: i.e., those with direct access to water. Unmatched firms were assigned SIC numbers from their description in directories, or from direct contacts with firms' officials. Sparse descriptions of firms listed in city directories for earlier years, but no longer extant, provided little guidance for assigning SIC numbers. These firms were classified with the code 9999.

While the larger waterfront cities on Puget Sound have city directories dating back to years prior to 1962, smaller communities often are covered only for recent years, or not at all. Combining information gleaned from DOR files with site visits generated 1982 inventories for harbors without contemporaneous city directories, but reconstructing inventories for early decades proved unfeasible.

The meaning of "shoreline establishments" was difficult to ascertain where a firm was located on port lands adjacent to waterways. Even where the establishment was located at some distance from the water's edge, access to water over common roads, docks, or ramps was usually available. For this reason, all firms on port lands contiguous to waterways were defined as shoreline establishments.

Establishments utilizing submerged lands, but having no proprietary interest in contiguous waterfront land parcels were excluded; aquaculture tracts and log-booming sites frequently fell into this category. Also excluded from the inventory were fishing boats because, even though many of these vessels are considered corporations, they are not permanent uses subject to shoreline land use regulation. However, the firms or port authorities leasing the docks and marinas where these vessels are moored are

included.

Further ambiguities arose where streets had been renamed, or where new shoreline landfills had occurred during the two decades under study. Some addresses changed from shoreline to upland as a consequence and were deleted from the inventory in subsequent years.

In 1996, the investigators purchased a proprietary database of firms located in coastal ZIP Code areas in 1992. Many of the same data issues arising in earlier decades resurfaced—i.e., firms listed only at their headquarters offices, or reporting P.O. boxes rather than addresses. Site visits were made to supplement and verify questionable data. Complicating the assignment of firms' SIC codes were the revisions to the SIC Manual in 1972 and 1987, which, in some cases significantly affected the level of aggregation of industries.

The degree to which an industry is *concentrated* on shoreline sites is a measure of its water-dependency. For example, marine cargo terminals are to be found only at the shoreline; restaurants, on the other hand, are virtually ubiquitous. In between those extremes, some seafood processing plants are found at both shoreline and inland sites and thus exhibit a less-than-absolute coastal dependency. Technological change, particularly in transport systems, has weakened some industries' coastal dependency. Fish, once delivered fresh to a dockside cannery from a fishing boat, now may move by common carrier in refrigerated containers, or as frozen product to an inland processing plant. Similar shifts in water-dependency are to be expected in segments of the forest products industry, petroleum products wholesale and distribution centers, and in sand and gravel and batch concrete firms. Using "Location Quotients"—a simple geographic measure of regional industrial concentration—industries showing a significant degree of concentration in the shoreline were identified (Goodwin, 1987).

Industries appearing in Seattle's urban shorelines were partitioned into three groups. Water-dependent and water-related industries serving primarily recreational markets (marinas, boatyards, boat dealers, yacht clubs, etc.), and those serving commercial/industrial customers (marine transportation, marine cargo handling, fish-processing, etc.), were defined as "recreational water-dependent" and "industrial water dependent," respectively. All remaining industries were considered non-water-dependent.

## **Results**

### **Puget Sound's Harbors 1962–92**

Figure 1 shows the number of establishments (individual firms at particular locations) on waterfront parcels in selected Puget Sound harbors for which data were available for each decade since 1962 (Bellingham, Bremerton, Everett, Olympia, Port Angeles, Seattle, and Tacoma).

It is easy to see where the growth has occurred: retail trade, finance, insurance, and real estate (F.I.R.E) firms, and services—industries that comprise the tertiary sector of the economy—have all grown strongly in the last 30 years. But the number of businesses engaged in construction, manufacturing, transportation and wholesale trade—the secondary sector of the economy—has been relatively stable.

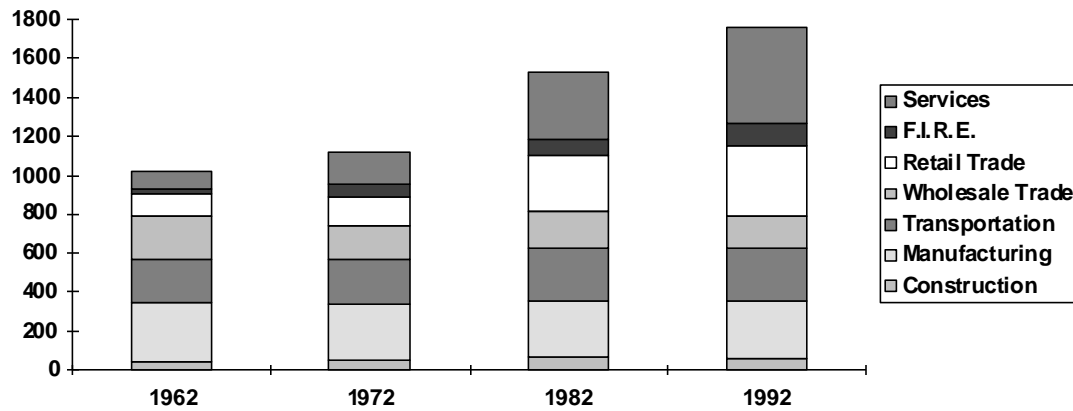


Figure 1. Puget Sound harbors: number of shoreline establishment by industrial sector, 1962–92.

But this is not the whole story, by any means. Puget Sound's harbors have grown (or shrunk) differentially, and much variation is revealed at the individual harbor level. Examining Seattle's shorelines in 1992, the year for which we have the latest data, there are dramatic differences in the mix of industries occupying shoreline parcels among the city's three main commercial/industrial harbor reaches. Figure 2 displays the percentage distributions of firms in industrial sectors in each reach over the four decadal time points.

On the Duwamish Waterways, firms engaged in manufacturing, transportation, and wholesale trade dominate the shoreline. Retail trade, finance, insurance and real estate, and services play a minor role. But on the Lake Union/Lake Washington Ship Canal shorelines, the situation is reversed. The tertiary sector is dominant: services, retail trade, and finance/insurance/real estate account for almost 70% of firms. Harborfront has the highest concentration of retail activities among the three harbor areas, but still retains a significant regional marine transportation role, primarily passenger ferries.

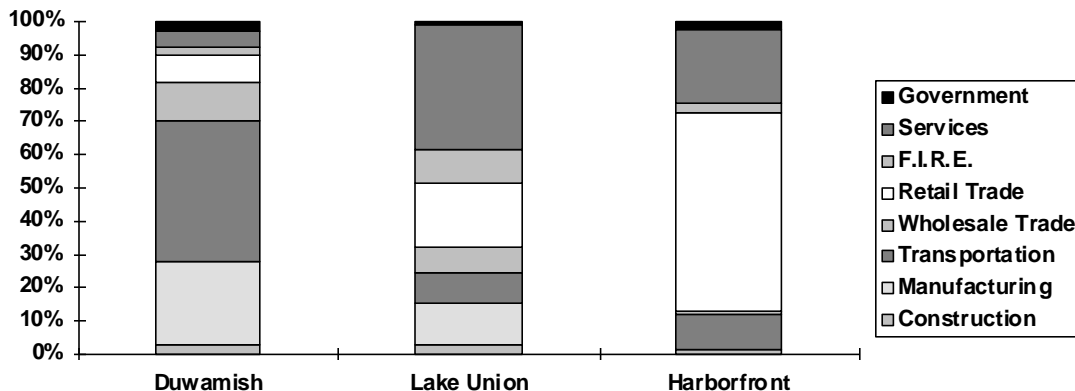


Figure 2. Seattle harbors: percentage of shoreline establishments by industrial sector, 1962–92.

### Harborfront

Anyone old enough to remember the Seattle World's Fair will also recall a very different Harborfront from the one we see today. Already abandoned by steamship lines, the downtown piers and transit sheds in 1962 still served the wholesale trade, especially in fish, paper, and cans. But, as Figure 3 shows, wholesale trade has given way to retailers and tourist services. Harborfront has been revitalized; many of the historic pier sheds have been adapted for retail and "water enjoyment" uses—aquariums, museums,

restaurants—while their perimeters still serve marine transportation and moorage needs, and permit public access to the water's edge.

When we break out firms by the kind of dependence they have on a waterfront location (Figure 4), we see that non-water-dependent establishments (e.g., office, retail, restaurant) have more than doubled. In contrast, water-dependent (and water-related) firms of an industrial nature (marine transportation, marine cargo handling, fish-processing, etc.) have diminished by 75%. Recreational water-dependent enterprises have played only a minor role until recently. (The new Bell Harbor short-stay marina and related businesses built since 1992 are not captured in these data).

Over the same 30 years, the Duwamish (including Harbor Island) has retained its gritty industrial character (see Figure 5). Its marine transportation terminals have grown in importance. Shore-based manufacturing—including cement, steel and non-ferrous metals, lumber, seafood, and shipbuilding, and much of the region's heavy marine construction industry—is based here.

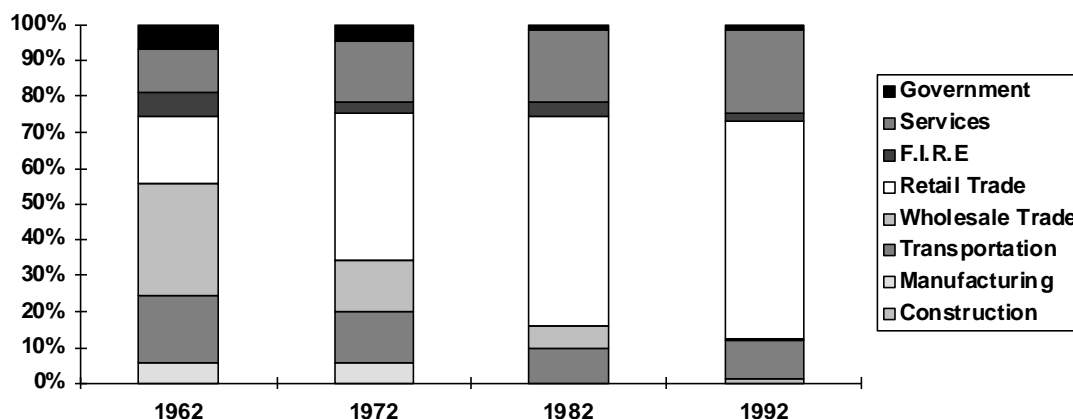


Figure 3. Seattle's Harborfront: percentage of shoreline establishments by industrial sector, 1962–92.

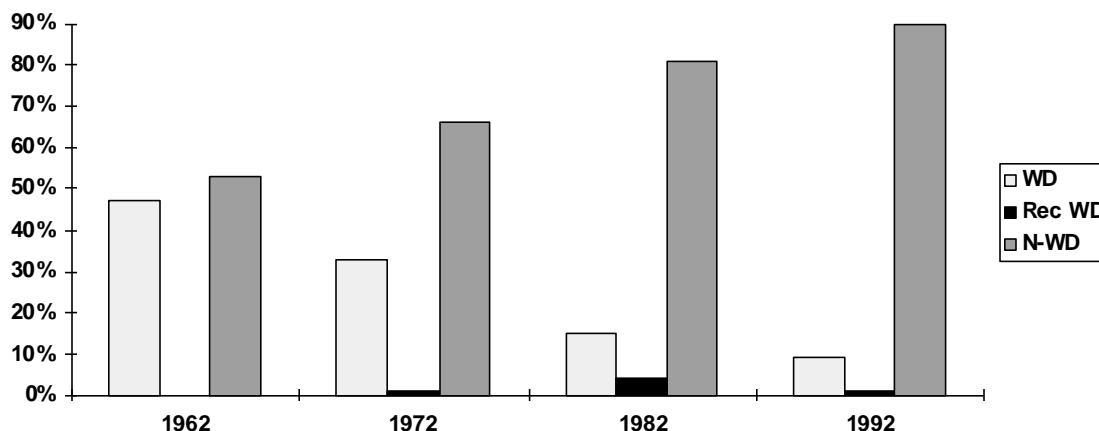


Figure 4. Seattle's Harborfront: percentage of shoreline establishments by type of water-dependency, 1962–92.

Industrial water-dependent industry has maintained a clear majority of businesses over the three decades. Non-water-dependent businesses have undergone a decline, while purely recreation-oriented non-water-dependent firms have scarcely made an inroad into this industrial waterfront territory. Figure 6 shows this relative stability.

Lake Union is intensely developed and supports multiple uses, including restaurants, fishing-support industries, marinas and boatyards, yacht brokerages and the region's busiest air harbor. The lake is surrounded by intensively developed uplands in residential and commercial uses.

Figure 7 shows that changes in the secondary sector along the lake and Ship Canal's shores were undramatic, but persistent: manufacturing, transportation, and wholesale trade's share has declined. The tertiary sector, led by services and retail trade, surged ahead. Over-building of offices prior to passage of the SMA resulted in vacancies that filled over the following decade. Adaptive reuse of warehouses and other industrial structures for office use has also occurred, and new mixed use developments that provide public access and transient moorage have been developed at the south end of the lake.

Water-dependent uses—both industrial and recreational—have grown in number, and the latter have almost pulled ahead (Figure 8). Non-water-dependent uses, once representing a minority of businesses on the lake, now outnumber water-dependent uses as office space built prior to shoreline management has been leased up.

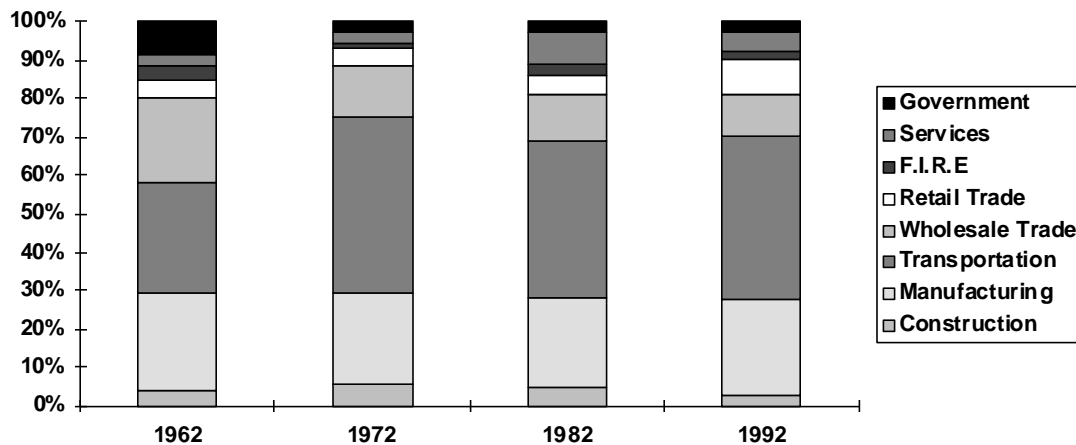


Figure 5. Seattle's Duwamish waterways: percentage of shoreline establishments by industrial sector, 1962–92.

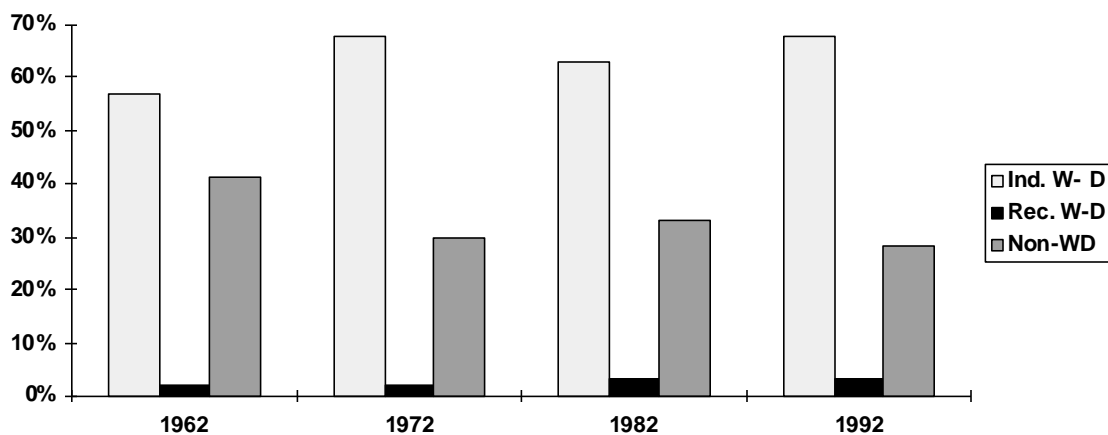


Figure 6. Seattle's Duwamish waterways: percentage of shoreline establishments by type of water-dependency, 1962–92.

## Conclusions

Has shoreline management been effective in giving priority to water-dependent uses? Let's now return to the final research question we asked: How effective has shoreline management been in protecting and enhancing W-D businesses in the shorelines? The evidence is mixed.

### Evidence for:

On the one hand we see that the industrial integrity of the Duwamish seems intact, and that W-D uses have grown, not diminished along the Lake Union/Ship Canal shorelines.

### Evidence against:

On the other hand, we see a continued increase in the number of non-W-D uses on Lake Union, and dramatically increasing retail activity on Harborfront. But indications of success are found in the details. No new principal-use office buildings have been permitted on Lake Union, and W-D uses, where permitted, have been required to provide generous amounts of public access and other amenities (City of Seattle, 1987).

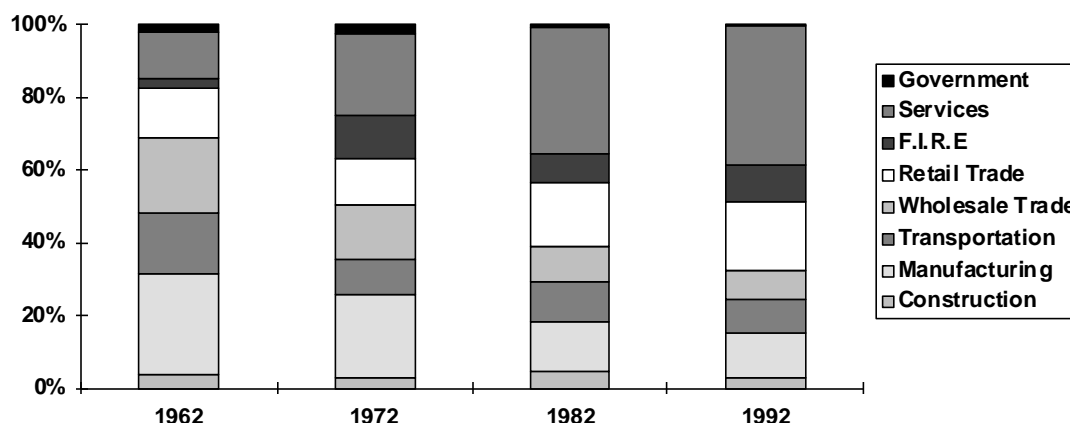


Figure 7. Seattle's Lake Union/Ship Canal: percentage of shoreline establishments by industrial sector, 1962-92.

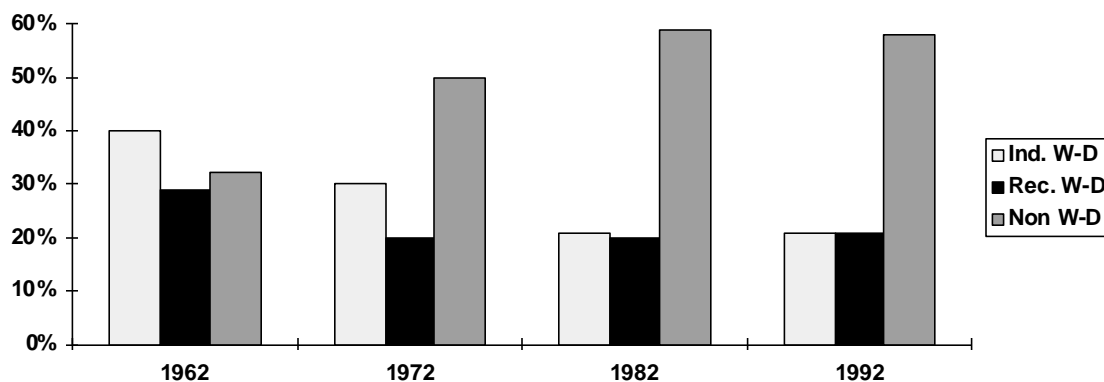


Figure 8. Seattle's Lake Union/Ship Canal waterways: percentage of shoreline establishments by type of water-dependency, 1962-92.

Along Harborfront, owners of historic pier sheds are permitted to incorporate retail shops and restaurants in redeveloped piers, but must improve and maintain the pier aprons for public access and vessel moorage. Consequently, Harborfront's redeveloped piers support marine activities such as moorage for tour boats and large fishing vessels.

A number of sites on Lake Union and the Ship Canal have been designated for water-dependent maritime and industrial uses, such as cargo handling, fishing vessel moorage, shipyards, and water-related manufacturing. In one case, a developer had sought City Council approval for a variance to permit a mixed-use, non-water-dependent development on a site designated "Urban Industrial." The council held firm, however, and their decision was vindicated when the former water-related industrial site (Champion Plywood) was redeveloped by an intracoastal marine transportation company servicing the Alaska trade, a water-dependent industrial use. Other small marine firms co-located on this site.

## **Implications**

Returning to my original precepts, it is clear that maintaining a healthy Puget Sound involves at least three considerations beyond the biological and physical health of the waters and beds of the Sound. Conserving our cultural and historic marine heritage, enhancing public access to the water and giving priority to water-dependent industry are some of the other ways we sustain a healthy Sound.

But not all of these goals can necessarily be achieved at the same time on the same site: public access and marine industry are often in conflict, and historic restoration and conservation may be economically unfeasible without rental income from non-water-dependent tenants. Priorities have been established among these goals for each of Seattle's three principal harbor reaches, and are backed by state law and local ordinances. They were informed by thorough analyses of the physical and economic characteristics of the shorelines, and the likely trends in shoreline use (City of Seattle, 1983).

At time of writing, the Port of Seattle is contemplating undertaking another comprehensive assessment of the demand for and supply of shoreline land for industrial maritime use. It is this author's hope that the shoreline land use trends reported in this paper, together with prior City of Seattle studies, will help inform their assessment and guide the Port Commission in making prudent and strategic land allocation commitments. The stock of shorelands suitable for marine industrial use is limited. Thoughtful conservation and reuse of urban industrial shorelands we now have will help avoid contentious siting decisions in the future and prevent industrial encroachment on rural shorelines.

## **Acknowledgments**

Funding for preparation of this paper was provided through grants from Washington Sea Grant Program, University of Washington, pursuant to National Oceanic and Atmospheric Administration Award No. NA36RG0071, and NA76RG0119, Project A/FP-2 (Marine Advisory Services). The views expressed herein are those of the author and do not necessarily reflect the views of NOAA or any of its subagencies.

## **References**

- Goodwin, Robert F. "Measuring Water Dependency, a Puget Sound Example." In *Coastal Zone '87, Proceedings of the Fifth Symposium on Coastal and Ocean Management*. American Society of Civil Engineers. New York, NY. 1987.
- Goodwin, Robert F. and Wonho Lee. "Changes in Urban Shoreline Use: Puget Sound Maritime Industries, 1962-95." In Miller, Martin C. and Jessica Kogan (Editors). *Coastal Zone '97 The Next 25 Years*. Conference Proceedings (abstracts of presentations) Vol. 2. Boston, MA. 1997.
- Seattle, City of. *Seattle's Commercial and Industrial Shorelines: Inventory Background Report*. Seattle, WA. September, 1983.
- Seattle, City of. *Seattle Shoreline Master Program Revisions*. Seattle, WA. 1987.
- Wagner, Mary Jo. *Water-Dependency as a Shoreline Allocation Criterion for Siting Maritime Industries in Puget*



***Puget Sound Research '98***

Sound, Washington. Unpubl. M.M.A Thesis, University of Washington, Seattle, WA. 1985.